SIGMA

250-KHX

Boiler feed pump

BOILER FEED PUMP 250 – KHX

Boiler feeding station is one of the most important auxiliary plants for operation of power station units working in close cooperation with main technological equipments of a unit.

Pump 250 − KHX is the main boiler feed pump−set for secondary feeding circuits of power plant generators. It is outstanding for its thorough operating safety and extra−reliability, long service life of working parts from corrosion−proof steel, and even favourable properties following from advantages of a barrel construction, so it can cope with the most severe conditions. It represents the thorough high−tech product contributing to working capacity and reliable running of the whole power unit.

APPLICATION

Pump 250 − KHX is intended for pumping treated feed water with max. temperature up to 180 °C, that must not form sediments and must be without any content of mechanical impurities and acid reaction.
Negative logarithm of hydrogen ionts concentration in feed water with temperatures from 10 to 180 °C must be in the range pH 6.8 − 9.2.

CONSTRUCTION

Pump 250−KHX is of centrifugal horizontal barrel type, that ensures constant heat operating conditions, minimal heat losses and safe operation.

Pump consists of cast external barrel into which there the cartridge together with the rotor are inserted. Hydraulic part is enclosed with high−pressure cover, in which there the balancing drum has been built. To the external jacket there the suction branch and the discharge one have been welded. Suction branch is arranged downwards, discharge branch is situated upwards.

That pump has been designed with the suction stage consisting of the impeller placed in the suction casing. Thanks to that, high suction capacity of the pump, substantial reduction of expenses on a feed water tank/deaerator location may be ensured, no booster pump is needed.

Pump design also allows so called “cold starting“, that is direct immediate running−in of a cold, non−warming−through pump with feed water operating temperature. Thanks to that, the pump high operation availability and reliability may be reached.

Rotor

Pump rotor is on its either side supported in split journal bearings taking−up the rotor radial load. Bearing shells are located on ground spherical surfaces, which allow adaptation of bearings to the rotor deflection with uniform load along the whole contact surface.

Both the journal bearing and the thrust tilting−pad one have been provided with forced oil lubrication with oil being supplied from a separate oil sopply facility.

Rotor is of free untightened type, with impellers being mounted on the shaft with interference, when hot. Pump smooth and safe running is possible owing to thorough balance of each impellers and the rotor dynamic balance as a compact unit. All measurements on the rotor have been recorded and those documents are supplied with each and every machine.

Pump rotor is sealed against the stator on both suction side and the discharge one with special and high−reliable mechanical seals. There so−called relieved stationary seals with rotating seats of the “SIGMA−CRANE“ type are used. On the customer demand it is possible to supply the pump with stuffing box with gland packing.

BALANCING DRUM

Rotor axial thrust acting in direction from the suction side to the discharge one is taken−up fully by a balancing drum. The balancing drum together with a thrust filting−pad bearing and further constructional element allow that pump „overheating“. However, that state is admissible only within the pump operation; pump starting−up is not allowed without water.

MATERIAL OPTIONS

Operating reliability, high wear resistance of feed pumps **250−KHX** in severe conditions of power industry duties are ensured with application of suitable wear−resistant materials. Materials that have been used there can cope with all requirements on the pump stability and may guarantee the hydraulic parts resistance against corrosion and cavitation.

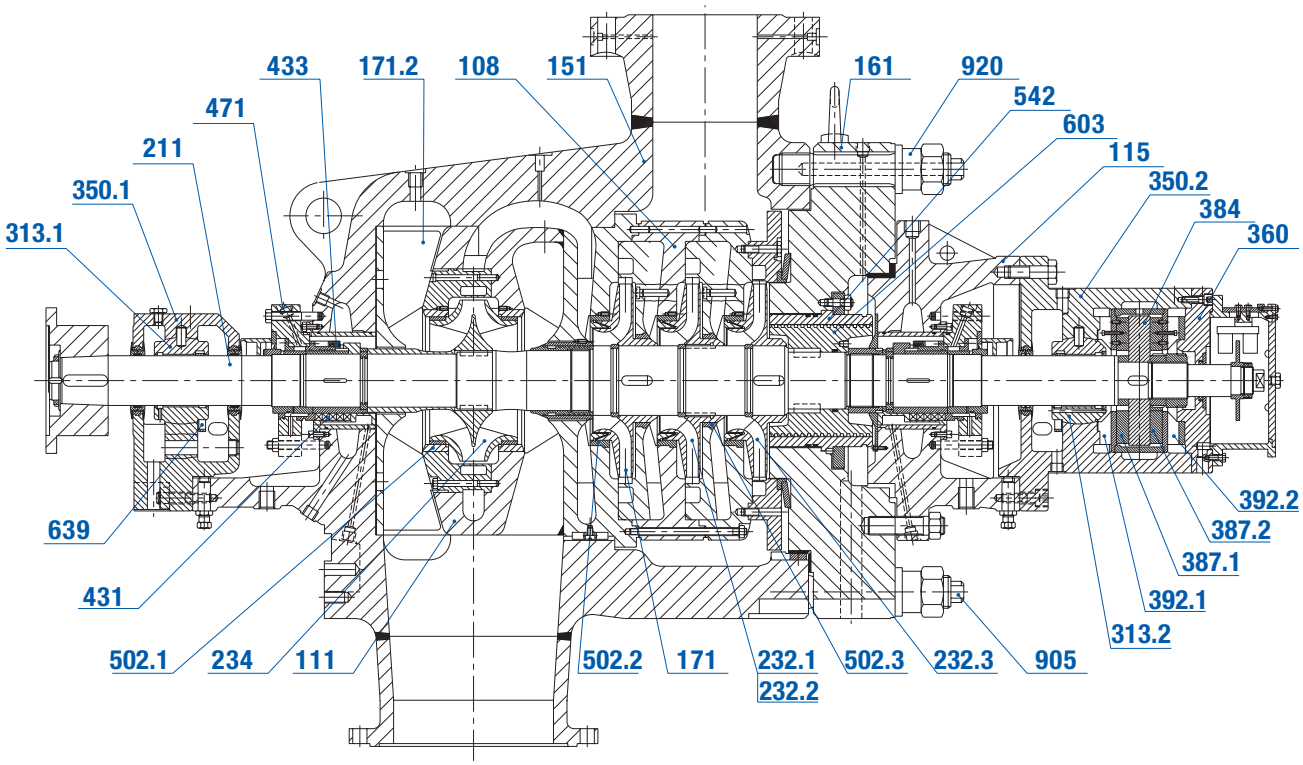
Research works and numerous operating verifications in our power plants have been realized, reaching optimum structure of materials and their properties, and further development works have continued yet.

DRIVE AND SENSE OF ROTATION

Feed pump **250−KHX** is driven by an electric motor solely, either direct driven or through a hydraulic coupling. Driving machine force is transmitted on the pump through a special claw coupling, that is lubricated with grease. That coupling has been provided with a removable spacer, that allows easy dismantling and replacement of a mechanical seal being placed on the pump closed drive side, without any need of the driving machine dismantling.

Pump rotates **clockwise**, as viewed from the drive side.

INFORMATORY CROSS-SECTIONAL ARRANGEMENT

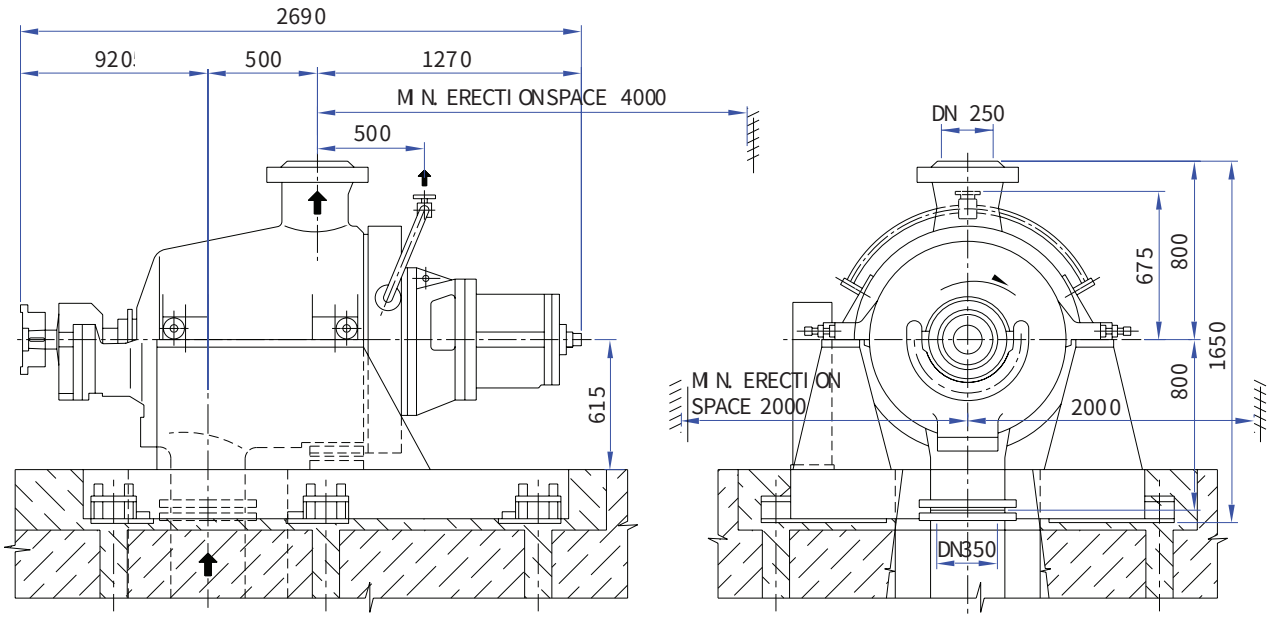


108	Stage casing
111	Suction piece
115	Seal housing
151	Shell
161	Shell guard
171.1	Diffuser
171.2	Diffuser
211	Shaft
232.1	2nd stage impeller
232.2	3rd stage impeller
232.3	4th stage impeller
234	Double−entry impeller

313.1	Journal bearing bush, front
313.2	Journal bearing bush,rear
350.1	Front bearing housing
350.2	Rear bearing housing
360	Thrust bearing cover
384	Thrust bearing runner
387.1	Front segment of thrust bearing
387.2	Rear segment of thrust bearing
392.1	Front carrier of segments
392.2	Rear carrier of segments

431	Gland packing
433	Mechanical seal
471	Mechanical seal flange
502.1	1st stage wear ring
502.2	Further stage wear ring
502.3	Diffuser wear ring
542	Drum bush
603	Balance bush
639	Oil ring
905	Cover bolt
920	Cover bolt nut

DIMENSIONS



Suction branch flange is machine, with raised face, PN on request.
Branch flange for PN 160, with smooth face.
More detailed dimensional drawing of the pump or the whole pump−set with drive may be received on request, after the final technical clarification.

MAIN PERFORMANCE DATA

Number of stages		4
Informatory working zone • Flowrate • Specific energy	 Q (m) Y ($l.s^{-1}$)	 80–275 560–800
Speed of rotation	n (min^{-1})	2885
Max. temperature of a pumped liquid	t (°C)	184
Nominal dia and nominal pressure of branches: • suction • discharge	 DN/PN DN/PN	 350/25 250/160
Amount of filtered cooling water of max. hardness 2° with temperature 33 °C Min. overpressure of cooling water	($l.s^{-1}$) (MPa)	2,75 0,3
Amount of lubricating oil with max. temperature 40 °C Overpressure of lubricating oil	($l.s^{-1}$) (MPa)	2,25 0,2–0,3
Rotor moment of inertia I	(kgm^2)	2,29
Pump weight inclusive of base frame	(kg)	8500

SIGMA GROUP a. s.
Jana Sigmunda 79
783 49 Lutín, Česká republika
+420 585 652 011, +420 585 652 060
+420 585 652 051, +420 585 944 294
info@sigma.cz
2014

www.sigma.cz